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ABSTRACT

This paper discusses the development of a sociocultural and local, context-sensitive base for guidance in selection and evaluation of instructional media. The development of system relationships criterion specifically targeted at 16mm educational film is the focus of the paper. Banathy's educational systems model is used as a base upon which additional components are added. The following system criterion are proposed: (1) political/social level (curriculum motivated vs. product driven influences); (2) professional preparatory level (academic/certification technology emphasis for educators); (3) capitalist educational support industry level (for profit agencies); (4) institutional level (system/state-wide administration); (5) administrative level (school); (6) instructional level (active curriculum); and (7) learning experience (classroom). These proposed criteria will be formulated into a traditional systems model in future works. (Contains 9 references.) (JLB)

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Tarnished Silver: Technology Images as History

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Background

In proposing a long-term study analyzing instructional media, we recognized that the selection and evaluation of media could be enhanced by a more theoretically grounded approach. Our goal became the eventual development of a sociocultural and local, context-sensitive base for selection/ evaluation guidance. Expectations of the interpretation included revelation of explicit and implicit ideological stereotypes and assumptions about our beliefs regarding teachers, teaching, classrooms and mediated education. Motivated by Bowers' discussion of the "current blindness" of the "conduit" view of software evaluation, we determined that an appropriate starting place was the expansion of the breadth of evaluation models primarily based on Gagné's events of instruction (1988, p. 47). In this manner we hope to include, among others, areas Bowers determined were neglected including language subjectivity and its influence on thought. Kerr provided the impetus for examination of evaluative methods drawn from sociology, policy sciences and anthropology to "shed new light on problems that have traditionally been approached using psychological research methods" (1985, p. 4).

Instrumental in synthesizing the purpose and direction of this analysis was Ellsworth's text, *The Ideology of Images in Educational Media* (1990). Her determination that until very recently, educational communications research was still focused on effectiveness and how learners gain from mediated messages provided sustenance to our goal of opening-up the evaluation model and applying the developed analysis directly to examine materials used to teach teachers about communications media and "technology." In this initial phase of our project we selected two 16mm films aimed at such purposes to guide our initial criterion development; *Audio Visual Materials in Teaching* (1956) and the later film, *Let Them Learn* (1967).

Theoretical Construct

The theoretical emphasis we have utilized for this analysis is derivative of primarily a social system model. It is not in conflict with systems models associated with education in general and instructional design specifically; all stem from an

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engineering model influenced by the biological organismic definition which recognizes environmental influences on the system. The systemic model should not be confused with the systems approach in education which is an empirical approach to the design and improvement of instruction based on a hierarchical/computational systems model. By investigating systems theory based models in other academic areas, we became disturbed by evaluation criterion which ignored larger aspects of impacting environment. Historically, we have recognized the implications of a number of contributing subsystems to the instructional system.

> The instructional system is a man-made system which has a dynamic interaction with its environment-teachers, learners, instructional resources, procedures, administrators, school board, parents, local community, government, and many other agencies. Furthermore, the instructional system is a system of interrelated parts working in conjunction with each other in order to accomplish a number of goals. (Saettler, 1968)

Buckley describes the appropriate system for analysis and directs attention to relationships.

> The kind of system we are interested in may be described generally as a complex of elements or components directly or indirectly related in a causal network, such that each component is related to at least some others in a more or less stable way within any particular period of time. The components may be relatively simple and stable, or complex and changing; they may vary in only one or two properties or take on may different states. The interrelations between them may be mutual or unidirectional, linear, non-linear or intermittent, and varying in degrees or causal efficacy or priority. The particular kinds of more or less stable interrelationships of components that become established at any time constitute the particular structure of the system at that time, thus achieving a kind of 'whole' with some degree of continuity and boundary. Also, we are mainly interested in systems within which some process is continually going on, including an interchange with an environment across the boundary. It is generally agreed that when we deal with the more open system with a highly flexible structure, the distinction between the boundaries and the environment becomes a more and more arbitrary matter, dependent on the purpose of the observer. (1967, p. 41)

By revisiting systems theory we could identify potential impacting factors contributing to the messages of our chosen texts at all levels of the system. We felt this would be a vital first step in the eventual creation of our long-term model. The system analysis will emphasize direct and indirect relationships and be able to assist in predicting the influence of any subsystem on the suprasystem. The model developed could therefore not only help explain what has occurred in educational media's past but also hopefully be used to make predictions about the future. In order to accomplish this, we begin by identifying the subsystems and propose the criterion

which will define their relationships to one another. The development of system relationships criterion specifically targeted at 16mm educational film is the focus of this paper.

Anglin notes the difference between model and theory, stating that "if the educator is not also informed of the processes and use of the appropriate theory base interpreting the model, the skills required to apply the systematic (systemic) approach may remain undeveloped" (1991, p. 135). Guiding the development of this systems analysis are three important texts; Buckley's (1967), *Sociology and Modern Systems Theory*; Curtis' (1982), *Evolution or Extinction, The Choice Before Us: A Systems Approach to the Study of the Future* which proved instrumental in applying systems theory to future concerns in order to appreciate potential trends; and Banathy's (1987) chapter, "Instructional Systems Design" in R. M. Gagné's (Ed.), *Instructional Technology: Foundations* from which the bulk of our analysis is based. We intentionally included texts outside the educational theorists' usual fields to enhance our ability to contribute to a broader evaluation interpretation of our own academy's mediated messages as well as theoretical roots of systems analysis.

Four areas which will be addressed during this initial phase of model development include; 1) political/social influences, 2) demonstrated education theory, 3) demonstrated technology theory, and 4) filmic elements. This project is an analysis aimed at opening-up our evaluation criteria for broader understanding with the purpose of creating an enhanced analytical view capable of determining and interpreting multiple messages in our educational media.

A Systems-based Model

The idea of a systems-based model appealed to us for multiple reasons beyond its significance to our field's history. Buckley (1967) compared the more prominent social system models and noted several desirable aspects of the applied systems theory (p. 39). Recognizing that the systems analysis is suited for large complex systems he states that complex open systems are affected more by the experiences that come to the system than by the initial state of the system. Therefore, a systems-based analysis of film would include our experience of bringing relevant contributing cultural, educational, technological, and filmic evaluative criteria to our interpretation. Each of these areas could potentially contain a myriad of related theory and application. Further, it would demand a focus on the characteristics of the relationships between these complex components.

Among six compelling factors extrapolated by Buckley which contribute to the allure of social systems-based perspectives included in the examination of our chosen films are four particularly resonant concerns for this study. The applied modern systems theory is attractive to sociology and by extrapolation the study of the technology culture's teaching artifacts as "a synthetic approach where piecemeal analysis is not possible due to the intricate interrelationships of parts that cannot be treated out of context of the whole" (1986, p. 35) To film theorists this concept lays at the root of film form interpretation. Bordwell & Thompson define film form as a system consisting of

"a unified set of related, interdependent elements" and take considerable care to delineate the "principles which help create the relationships among the parts" (1986, p. 35).

This commonality of purpose correlates nicely with two more of Buckley's observations which recognize the system's model as capable of developing a viewpoint that sees "in terms of information and communication nets" and recognizes the approach as "a study of *relations* rather than 'entities'" that allows the system to be perceived as "a flexible structure with many degrees of freedom."

Finally Buckley sees the systems approach as providing opportunity for the development of "an operationally definable, objective, non-anthropomorphic study of purposiveness, goal-seeking system behavior, symbolic cognitive processes, consciousness and self-awareness, and sociocultural emergence and dynamics in general" (1967, p. 39). Again, Bordwell & Thompson echo this ideal in their discussion on complexity criterion-based analysis when they argue that "complex films (not simply complicated films) are good insofar as they engage our perception on many levels, create a multiplicity of relations among many separate formal elements, and tend to create interesting formal patterns" (1986, p. 34).

We are recognizing that all films approached from the level of modern systems-based analysis can be evaluated in a developed interpretation of Bordwell & Thompson's "complex" standards by recognizing evaluative experiences as an enhancement of the system-based model which provides our reading with expanded exposition of formal elements and patterns. Bordwell & Thompson concur that form is "the overall system of relations that we perceive among the elements in the whole film" (1986, p. 24). This inclusion of the semiotic element of the index will hopefully allow formal elements to be opened up and related to other systems discussed allowing for revelation of complex relationships expressed in formal elements and patterns.

Banathy provided us with a systems-context model within the field of instructional technology which we felt was appropriately open to many of the influencing types of relationships and impacting systems we sought to explore. Following stated criteria, we used Banathy's educational systems model as a base upon which we advanced additional components by defining criterion related to 16mm educational film production which will allow us to explore;

1. The characteristics of the hierarchy of systems operating at various interconnected levels, their relationships, and mutual interdependencies;

2. The relationships, interactions, and information-matter energy exchanges between the system of interest and its environment;

3. The purposes and boundaries of the system of interests;

4. The dynamics of interactions among the components of the system and their relationship patterns;

5. The properties and characteristics that emerge at various system levels

as the result of systemic integration and synthesis; and

6. The behavior and change of the system, its environment, and its components through time. (1987, p.88)

Turning to Buckley (1967) we gleaned several useful terms which we then adapted to the purposes of this model for evaluation.

system
a continuous, boundary-maintaining, variously related assembly of parts; aspects of system may change periodically or consistently without dissolution of system

relations
shifting structure in relation of parts

structure
systemic relationships

information
a relationship between sets or ensembles of structured variety

Reviewing these terms clarifies what we will be seeking; relationships between the subsystems. How do they influence one another and can we identify emphasis in interactions that will assist in meaningful interpretation?

Proposed System Criterion for 16mm Educational Technology Films

POLITICAL/SOCIAL LEVEL:
Curriculum motivated vs. product driven influences
- economic support
  - government
  - capitalist
  - democratic mediation involvement (censorship/endorsement)
- prevalent evaluative practices
  - educational
  - technological
  - media literacy
- prevalent cultural values
  - gender
  - ethnic
  - economic
  - special populations

PROFESSIONAL PREPARATORY LEVEL:
Academic/certification technology emphasis for educators
- potentially applied theoretical information
  - medium appropriate evaluation criteria presented
  - filmic/semiotic
  - prevailing technological theory
  - prevailing educational theory
- use by professional preparatory educators

CAPITALIST EDUCATIONAL SUPPORT INDUSTRY LEVEL:
for-profit agencies
- film production values
  - technological developments
  - entertainment industry influences
- economic support
  - government
  - democratic mediation involvement (censorship/endorsement)
- technological development/ expectations
- production encoding
  - filmic
  - prevailing technological theory
  - prevailing educational theory
  - prevailing socio/political theory

INSTITUTIONAL LEVEL:
system/state-wide administration

- prescribed curriculum
  - censorship/endorsement-socio/political and economic
  - theoretical support for film use as viable teaching method
  - administrative support for materials acquisition
  - assistance-support services including personnel and training
- evaluative organization
  - acquisitions
  - internal mechanisms

ADMINISTRATIVE LEVEL:
school

- prescribed curriculum
  - censorship-socio/political, administrative and economic
  - theoretical support for film use as viable teaching method
  - availability-administrative/economic support for materials acquisition
  - assistance-support services including personnel and training

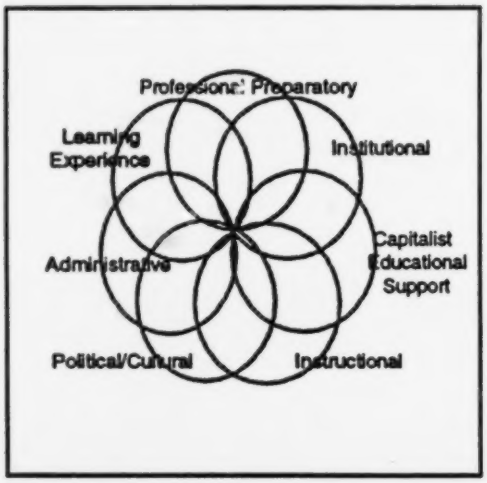
INSTRUCTIONAL LEVEL
active curriculum

- teacher external preparation
- expressed educational theoretic decoding
- film used as viable teaching method
- educational support
  - availability-institutional/for-profit support for acquisition
  - assistance-support services including personnel and internal training

LEARNING EXPERIENCE LEVEL
classroom

- Administrative support
  - assistance in acquisition
  - theoretical
  - socio-political
- Evaluative criteria
  - filmic/semiotic
  - educational/theoretical
  - technological/theoretical
  - socio-political
- Teaching style/presentation (external representativeness of internal truths)

Graphical Representation of Criterion Levels



We developed the above graphical representation of proposed criterion to illustrate the inter-relatedness of the levels. The textual format bothered us, since we recognized that many levels within our schemata interact at various points with many other levels. Linear or strictly hierarchical interpretations of our proposed criteria are incorrect.

Future Work

Our work on an enhanced model has just begun. Our proposed criterion will be formulated into a traditional systems model. To achieve this, we will characterize the organized complexity of the suprasystem which created these 16mm instructional vehicles by

enumerating elements of inquiry provided by Banathy.

a. Clarify the levels that constitute the hierarchy and identify systems that operate at the various levels;
b. Designate the primary-system level in the hierarchy;
c. Clarify the key-systems entities around which the various systems are built;
d. Specify the purposes of these systems;
e. Specify their input, and
f. Output;
g. Designate control and decision-making authority at the various levels;
h. Display the relationships among the various systems;
i. Define the degree to which the systems are closed or open. (1987, pp. 95-96)

From this model, we will be able to begin the truly visual component of reading selected films in relationship to the model. We are convinced that this analysis will provide information which will aid in the development of our proposed model. It is a start in what promises to be an exciting and fruitful investigation of our past messages to educators. We strongly feel that examining our historical media will provide valuable insights into the future as well as clarify our past performance.

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